

ABSTRACT

Maintenance and Upgrades on the Silicon Detector at CDF

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The CDF Run II silicon detector is the largest operating silicon detector in high-energy physics. Its 722,000 channels spread over 7 m² of silicon microstrip sensors allow precision tracking and vertexing. The CDF silicon detector played a critical role in the discovery of B_s mixing and is used extensively for the current Higgs Boson searches. Over the last 7 years, the detector efficiency has remained stable at 95% after the Run II commissioning period. While originally designed to withstand radiation doses equivalent to a period of 3 fb⁻¹ of data, the CDF silicon detector will have to last until the end of Run II when 10 fb⁻¹ of data is expected to be delivered. The paper presents the observed effects of infrastructure aging and the solutions implemented to prevent them, with the emphasis on work during the summer 2009 shutdown. We discuss upgrades in the data acquisition component testing, testing and installation of power supply modules, and the repair work performed on the detector cooling system. Taken actions ensure that CDF silicon detectors can run at high efficiency in 2010 and beyond.